REMARKS

The Office Action of July 2, 2004 has been received and its contents carefully considered.

Claims 1 to 6 are all the claims pending in the application.

Claims 1 to 6 have been rejected under 35 U.S.C. § 103(a) as obvious over U.S. Patent 5,458,892 to Yatka et al in view of U.S. Patent 4,352,825 to Cherukuri et al.

Applicants submit that Yatka et al and Cherukuri et al do not disclose or render obvious the subject matter of claims 1 to 6 and, accordingly, request withdrawal of this rejection.

The present invention as set forth in claim 1 is directed to a coated product wherein the product is coated with a coating composition comprising hydrogenated indigestible starch syrup as a binding agent. The hydrogenated indigestible starch syrup is referred to herein as HISS.

The Examiner states that Yatka et al disclose a chewing gum product which is coated with a sugar free, co-dried blend of indigestible dextrin and hydrogenated starch hydrolysate (HSH).

The Examiner argues that it would have been obvious that this blend is "equivalent" to applicants' claimed syrup (HISS), since the indigestible dextrin in Yatka et al makes the blend indigestible, and since HSH is equivalent to hydrogenated starch syrup, as evidenced by column 3, lines 60 to 61 of Cherukuri et al.

In response, applicants point out that neither Yatka et al nor Cherukuri et al disclose or suggest HISS, or the use of HISS. Accordingly, the combination of these two references would not lead one of ordinary skill in the art to the use of HISS since neither one discloses HISS. The

Examiner has provided absolutely no reason as to how one of ordinary skill in the art is led to HISS by the teachings of these two references.

The Examiner's basis for this obviousness rejection is that the indigestible dextrin disclosed in Yatka et al would be "equivalent" to applicants (HISS). Even if it is assumed that the HISS set forth in the present claims is equivalent to the indigestible dextrin of Yatka et al, one of ordinary skill in the art still is not led to the HISS employed in the present claims because neither Yatka et al nor Cherukuri et al disclose HISS. Accordingly, the combination of these two references cannot render obvious a coated product that contains an HISS.

In order to render obvious a claim that recites HISS, there at least must be some teaching disclosing or suggesting HISS. Since neither Yatka et al nor Cherukuri et al disclose HISS, applicants submit that it is impossible for the combination for these two references to render obvious the present claims.

Further, the Examiner's arguments suggesting that the blend of indigestible dextrin and hydrogenated starch hydrolysate (HSH) is equivalent to the claimed syrup (HISS) is not proper. The reasons follow.

First, indigestible components contained in HISS are different from those contained in indigestible dextrin in molecular weight and the content of α-1,6 linkages.

HISS is obtainable by a process comprising: hydrolyzing pyrodextrin with a combination of alpha-amylase and a debranching enzyme by dual stage hydrolysis. In contrast, indigestible dextrin is obtainable by a process wherein a debranching enzyme is not used.

Therefore, the molecular weight and the content of α-1,6 linkages of the indigestible components contained in HISS are much lower than those of the indigestible components contained in indigestible dextrin.

Second, the indigestible components contained in HISS are hydrogenated, while the indigestible components contained in indigestible dextrin are not hydrogenated.

Third, HISS is non-cariogenic, while indigestible dextrin in general contains fermentable components and therefore is cariogenic. See column 4, lines 1-17 of Yatka et al.

Fourth, HISS (hydrogenated indigestible starch syrup) is totally different from HSH (hydrogenated starch hydrolysate).

Thus, the blend of indigestible dextrin and hydrogenated starch hydrolysate (HSH) is not equivalent to the claimed syrup (HISS).

In view of the above, applicants submit that the subject matter of claims 1 to 6 is patentable over Yatka et al and Cherukuri et al and, accordingly, request withdrawal of this rejection.

Claims 1 to 6 have been rejected under 35 U.S.C. § 103(a) as obvious over JP 10-150934A in view of Yatka et al.

Applicants submit that JP '934 and Yatka et al do not disclose or render obvious the subject matter of claims 1 to 6 and, accordingly, request withdrawal of this rejection.

The Examiner states that the present application, at page 2, lines 23 to 26, discloses that JP '934 prepares HISS in the manner set forth in claim 3 to be used in food products.

The Examiner argues that it would have been obvious to use an HISS to coat chewing gum, since it is old to coat chewing gum with a co-dried blend of indigestible dextrin and HSH, as evidenced at column 6 of Yatka et al, and since this blend would be substantially equivalent to HISS.

Applicants enclose an English language computer translation of JP '934 from the website of the Japanese Patent Office.

JP '934 discloses that the HISS is indigestible, and can be used in foods that can use a dextrin, a maltodextrin, a starch syrup and the like. JP '934 also discloses that the HISS can be used in a chewing gum.

Applicants submit, however, that the Examiner's arguments that it would have been obvious to use HISS to coat chewing gum is not proper. The reasons follow.

Yatka et al disclose the use of indigestible dextrin in a coating for a pellet gum. See column 2, lines 17-19 and claims 13-16. However, Yatka et al do not disclose HISS.

JP 10-150934 discloses the use of HISS in a food such as chewing gum. See column 5, lines 12. However, JP 10-150934 does not teach or suggest the use of HISS as a binder in a coating of a coated product.

Although JP '934 discloses that the HISS is indigestible and can be used in foods that can use a dextrin, a maltodextrin, a starch syrup and the like, and although JP '934 discloses that the HISS can be used in a chewing gum, applicants submit that it is not obvious to use HISS in a coating for food or other coated products.

First, when a material is hydrogenated, its properties change radically. For example, there is a big difference in the properties of dextrose and the hydrogenated version of dextrose called sorbitol. Besides its obvious metabolic properties (lower calorie and non-cariogenic properties), its physical properties are also changed. Dextrose has a good crystalline nature, whereas sorbitol does not. Dextrose is not hygroscopic, whereas sorbitol is. The same is true for the hydrogenated indigestible starch syrup which is similar to a hydrogenated indigestible dextrin. The properties of the hydrogenated version of indigestible dextrin would not be expected to be the same as the non-hydrogenated form of indigestible dextrin.

As noted above, JP '934 discloses that HISS can be used in a chewing gum. However, adding HISS to chewing gum is much different than putting an HISS material onto a chewing gum as part of a coating. Chewing gum is made by a specific process of mixing ingredients together, extruding the mixture and forming the piece. The coating is made by an entirely different process by adding pieces of manufactured chewing gum center to a tumbler or coating pan, adding various crystallizable syrups, and drying the syrups to form a shell around the piece.

In addition, as mentioned above, HISS is totally different from indigestible dextrin. Thus, the mere fact that Yatka et al disclose the use of indigestible dextrin in a coating does not suggest that HISS should be used in a coating. Moreover, as discussed above, and contrary to the Examiner's position, a blend of indigestible dextrin and HSS is not equivalent to HISS.

Thus, applicants submit that it would not be obvious to use HISS to coat chewing gum.

Further, the present invention achieves unexpected results.

The use of HISS as a binder in a coating makes it possible to obtain a coated product with increased stiffness to reduce the chipping after manufacturing and several days of storage, and before wrapping. The advantages achieved by the use of HISS, as a binder in a coating are remarkable and unexpected as shown on page 27, line 9 to page 28, line 20, Tables 11 and 12 of the text.

Chipping test results shown in Tables 11 and 12 are summarized below.

Table 11 Zig-zag method (Chips per 100 pellets)

	HISS	24 hours	48 hours	72 hours	7 days
Example A1	no	120	120	132	137
Example A2	no	97	127	133	150
Example A3	no	129	149	121	180
Example 1	yes	3	3	9	19
Example 2	yes	40	33	47	42

Table 12 Bucket test

	HISS	24 hours	48 hours	72 hours	14 days
Example B	no	50	69	70	138
Example 3	yes	20	48	1	10

These data clearly show a significant reduction of the number of chipped pellets when HISS is used in the coating syrup compared to a gum talha (gum Arabic) material or other additives.

(c) If HISS is replaced by a blend of the indigestible dextrin and HSH, the same results (reduction of the number of chipped pellets) cannot be expected. In addition, the blend of indigestible dextrin and HSH would increase cariogenicity, decrease sweetness and cause browning.

In view of the above, applicants submit that JP '934 and Yatka et al do not disclose or suggest the subject matter of claims 1 to 6 and, accordingly, request withdrawal of this rejection.

Applicants also enclose a new set of corrected drawings, including an annotated drawing for Figure 3.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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Date: October 4, 2004

AMENDMENTS TO THE DRAWINGS

The attached three sheets of Replacement Drawings include:

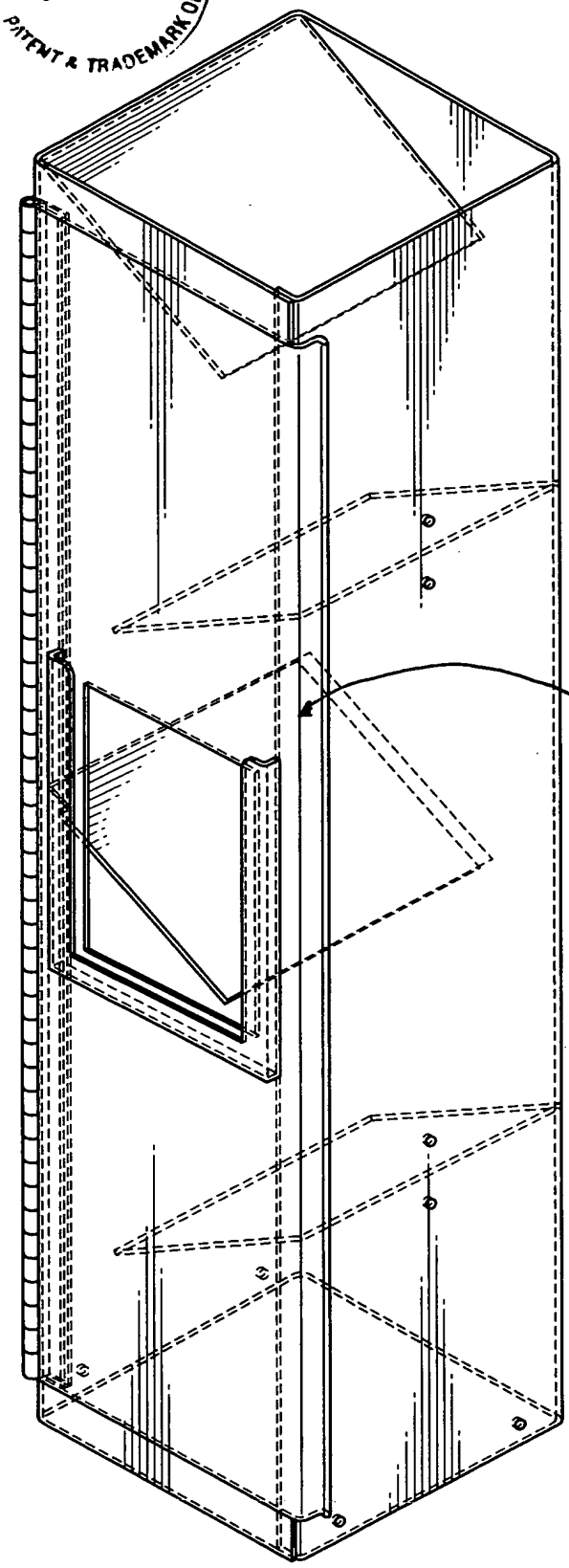
In Fig. 1, the term "Corn Srup Solid" has been corrected to --Corn Syrup Solid-- next to the symbol —Δ—.

In Fig. 3, an inadvertently omitted solid line has been added.

Attachment: Annotated Marked-Up Drawings of Figure 3 (one sheet)
Replacement Sheets (3)

FIG.3

Structure of
Zig-Zag Tester



PATENT ABSTRACTS OF JAPAN

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(54) HARDLY DIGESTIBLE REDUCED STARCH SYRUP AND FOOD FORMED BY USING THE SAME

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a starch syrup which is low in calorie, has various kinds OF physiological effects, is noncariogenic, has a low browning property and has moderate sweetness and viscosity by hydrolyzing acid-added and broiled dextrin by liquefying type α-amylase, and reducing the hardly digestible starch syrup obtd. by further hydrolyzing the mixture by making combination use of debranching enzyme and β-amylase, etc.

SOLUTION: The broiled dextrin is obtd. by heat treating raw material starch (e.g.; corn starch) in the presence of an acid (more preferably hydrochloric acid) and 1 to 10(wt.)% water. Next, the broiled dextrin is dissolved in water to a concn. of 20 to 45% and is adjusted in pH by using a neutralizer, such as sodium hydroxide. The broiled dextrin is then hydrolyzed by adding 0.05 to 0.2% liquefaction type α-amylase. Further, the broiled dextrin is hydrolyzed by making the combination use of the debranching enzyme (more preferably pullulanase) and the β-amylase or the debranching enzyme and saccharifying amylase (more preferably α-amylase derived from fungi) to obtain the hardly digestible starch syrup. The desired starch syrup is obtd. by reducing the hardly digestible starch syrup obtd. in the manner described above.

LEGAL STATUS

[Date of request for examination] 29.08.2003

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[Patent number]

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[Date of extinction of right]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the food containing the reduction difficulty slaking property starch syrup and this which are obtained by returning a difficulty slaking property starch syrup.
[Description of the Prior Art] Also in Japan, eating habits also change with improvement in a living standard in recent years, and the European and American level has been approached. Average life extends as this result, and since the rapid aging phenomenon occurred, disease structure changed and the adult disease increased remarkably, the healthy intention is increasing by leaps and bounds. Attention is attracted as a raw material which raises the function of food from the place which has a biological regulation function centering on the improvement of the constipation of a dietary fiber and an oligosaccharide as an example of a food raw material which has a biological regulation function in this.
[0002] The matter of difficulty slaking property like these dietary fibers and oligosaccharides shows behavior various within an alimentary canal, and discovers the physiology effectiveness to a living body. First, in an upper gastrointestinal tract, a water-soluble dietary fiber brings about lowering of the passing speed of food, and absorption delay of a nutrient takes place. For example, absorption delay of sugar controls lifting of the blood sugar level, and discovers effectiveness, such as insulin economization, in connection with it. Moreover, by promoting elimination of bile acid, sterol groups in the living body decrease in number, and the effectiveness of the cholesterol in a blood serum falling also shows up. In addition, the physiology effectiveness through an endocrine system in the living body is also reported. Moreover, the description of these difficulty slaking property matter is escaping the digestion to a small intestine and reaching to the large intestine. Utilization of some the oligosaccharides and dietary fibers which reached to the large intestine is carried out with enterobacilli, and it produces short chain fatty acid, intestines gas, a vitamin, etc. Souring of the intestines milieu interne by short chain fatty acid brings about a ready intestines operation, and while the absorbed short chain fatty acid is metabolized and becomes energy, checking cholesterol composition is also reported. Furthermore, it is also reported recently that some dietary fibers are non-carious.
[0003] Among difficulty slaking property matter, the reduction difficulty slaking property dextrin which are the maltitol and poly glucose which are manufactured as a raw material, a difficulty slaking property dextrin (dietary fiber content dextrin), and its reduction object is known, and starch can be used for wide range food from it being water solubility. However, although it is suitable in using it as a substitute of cane sugar since sugar-alcohol, such as maltitol and a sorbitol, has sweet taste comparable as cane sugar and it is hard to brown in these water-soluble difficulty slaking property matter Since hygroscopicity is strong and the firmness as Kandy is bad moreover it is [that sweet taste is strong and] unsuitable or a thick feeling is missing depending on food for low viscosity, other than liquefied food, it may not be suitable, and since there is ****** in addition, an application is limited. Moreover, although poly glucose is low sweet taste, a chip and ****** are in a thick feeling and carious is observed in part again.
[0004] Make alpha-amylase JP,2-145169,A act on a roast dextrin, manufacture a difficulty slaking property dextrin and transformer glucosidase or (reaching) the beta-amylase is made to act as a conventional technique about a reduction difficulty slaking property dextrin after the method of hydrogenating this and manufacturing a reduction difficulty slaking property dextrin, and an alpha-amylase operation, after making a dietary fiber increase, it hydrogenates, and the method of manufacturing a reduction difficulty slaking property dextrin is indicated. Glucoamylase is made to act on a roast dextrin following alpha-amylase, and the approach of hydrogenating these dietary fiber high content dextrins, and returning to them following the approach of extracting a part for a dietary fiber by chromatography fractionation, and

manufacturing a dietary fiber high content dextrin, and the method of making transformer glucosidase act and making a dietary fiber increase before chromatography fractionation, is indicated by JP,2-154664,A.
[0005] Although these difficulties slaking property dextrin is low sweet taste, hygroscopicity is low and a thick feeling can be given, other sweetners since sweet taste is low on the other hand needs to be used together, there is carious, it is coloring a little in the commercial item, browning tends to take place during the inside of manufacture of the food of neutrality [pH], or preservation, it boils down, and the bad debt at the time also tends to happen. Moreover, although it boils down and the bad debt at the time improves, it is the same as that of a difficulty slaking property dextrin to browning be [of a difficulty slaking property dextrin] the nature and that sweet taste is low of a reduction difficulty slaking property dextrin. Then, the fault which the water-soluble aforementioned dietary fiber has is improved, and since not only low energy but the physiology effectiveness to hold and the difficulty slaking property matter which has non-carious one and can be used for wide range food are not developed and commercialized, it is anxious for the appearance from various kinds of food industries.
[0006]
[Problem(s) to be Solved by the Invention] Therefore, the technical problem which this invention tends to solve is obtaining the reduction difficulty slaking property starch syrup which has various kinds of physiology effectiveness in addition to being low energy, it is non-carious, and browning nature's has moderate sweet taste and viscosity low, can be mixed with sugar-alcohol with other high hygroscopicity and bad firmness, and can improve these faults.
[0007]
[Means for Solving the Problem] This invention makes the debranching enzyme represented at pullulanase following liquefaction mold alpha-amylase, the aforementioned difficulty slaking property dextrin, and the new technique, i.e., an acid addition roast dextrin, which is not conventionally known about manufacture of a reduction difficulty slaking property starch syrup, the beta-amylase, or a debranching enzyme and a saccharifying amylase act, obtains hydrolyzate. by returning this, solved the aforementioned technical problem and completed this invention. As raw material starch of the reduction difficulty slaking property starch syrup of this invention, wide range starch, such as corn starch, potato starch, ******, and a tapioca starch, can be used. In order to obtain a difficulty slaking property starch syrup from this starch, it is indispensable to add an acid as a catalyst. Although various kinds of things are mentioned as an acid, considering being a food grade, an inorganic acid is desirable and it is desirable especially to use a hydrochloric acid. About (3 - 10 % of the weight) several % of the weight is suitable for the addition of a hydrochloric acid to starch in the water solution of the concentration around 1 % of the weight. Since an acid water solution is added before heat-treatment, in order to mix starch and an acid to homogeneity, it is made to stir and ripe in a mixer, and heat-treatment is performed, after carrying out predrying so that the moisture of mixture may become 1 - 10 % of the weight. Unlike the heating conditions of the conventional **** roast dextrin (white dextrin and yellow dextrin), heating conditions obtain preferably at 150-200 degrees C for 10 minutes to 120 minutes by carrying out heat-treatment for 15 minutes - 60 minutes. Although the content of the difficulty digestive component in the object product increases [the higher one], since the coloring matter increases from near 180 degree C, the temperature of reaction time is 150 degrees C - 180 degrees C more preferably.
[0008] Since it is also possible to react an elevated-temperature short time by choosing heating apparatus, if the equipment which can perform a uniform reaction is used, it can heat-treat efficiently. Moreover, since it was a reaction in a powder condition and heating conditions needed to be changed in the case of large scale production, after examining the quality of the product after heat-treatment, it is desirable to change heating conditions suitably. Thus, as a product obtained, the content of the dietary fiber is so desirable that it is high, in order to consider as low calorie content, but on the other hand, since it is required to also make moderate sweet taste discover, it is more preferably limited to 40 - 60% of the weight or more of a thing 30 to 60% of the weight.
[0009] Subsequently, after dissolving a roast dextrin in water, making it 20 - 45% of the weight of concentration and adjusting pH to 5.5 to about 6.5 using neutralizers, such as a sodium hydroxide, about 0.05 - 0.2% of the weight of liquefaction mold alpha-amylase is usually added, and it is 80-95 degrees C which is the operative temperature of alpha-amylase, and usually hydrolyzes for about 1 hour. Although each commercial item can use it as this liquefaction mold alpha-amylase, Termamyl (trade name: heat-resistant alpha-amylase by the Novo Nordisk bio-industry company) is the most desirable.
[0010] Then, a debranching enzyme, the beta-amylase, or a debranching enzyme and a saccharifying amylase are used together, and it hydrolyzes. Pullulanase is the most desirable although isoamylase can also be used as a debranching

enzyme. Although each enzyme of the malt origin, the mold origin, and the bacteria origin can use it as the beta-amylase and a saccharifying amylase, it molds as a saccharifying amylase and the alpha-amylase of the origin is the most desirable. As for pH at the time of making pullulanase, the beta-amylase, or pullulanase and a saccharifying amylase act, 5.0-6.0 are desirable. The addition of both the enzyme agent is about 0.05 - 0.2 % of the weight similarly, respectively. Reaction temperature is about 55-60 degrees C, and the resolving time is usually about 24 - 48 hours.
[0011] Moreover, after hydrolyzing a roast dextrin by liquefaction mold alpha-amylase first, and carrying out application-of-pressure cooking processing for hydrolysis liquid at 115-135 degrees C, the filtration velocity at the time of purification can also be raised by making alpha-amylase act again. In addition, no additions of an enzyme agent are limited to the aforementioned range, and should just add an equivalent amount according to the potency of an enzyme agent. Moreover, reaction time can also be freely adjusted by fluctuating an addition. After making an enzyme agent act, pH is reduced before and after 3.5, then, solution temperature is raised till around 80 degrees C, and the usual activated carbon decolorization, filtration, demineralization by ion exchange resin, and decolorization are performed henceforth. Next, it condenses to about 50 - 70% of the weight of concentration, and a difficulty slaking property starch syrup is obtained.
[0012] Next, although a difficulty slaking property starch syrup is returned, this reduction (hydrogenation) reaction is the same as that of the conditions generally performed to starch sugar, usually adds common reduction catalysts, such as a Raney nickel catalyst, Raney cobalt, and nickel diatomite, and performs hydrogenation under hydrogen pressure 50 - 130 kg/cm2, and a normal service condition with a temperature of about 50-150 degrees C. As for heating in this case, it is desirable to perform hydrogen into a solution, after making it fully dissolve until it will be in a saturation state, it is contrary at this, and when supply of hydrogen is inadequate, the side reaction which oxidation, hydrolysis, etc. do not have may occur. Although the difference in some has this hydrogenation by reaction conditions, such as temperature and a pressure, it usually ends within 2 hours. Next, activated carbon decolorization, filtration, demineralization by ion exchange resin, and decolorization are again performed after the purification usually used by the technical field concerned, for example, catalyst separation.
[0013] By the aforementioned manufacture approach, the content of maltitol is obtained for the content of a dietary fiber, and an energy value is acquired for a reduction difficulty slaking property starch syrup 2 kg-cal or less at 15 - 40 % of the weight 30 to 60% of the weight. The reduction difficulty slaking property starch syrup obtained by this invention can be used for almost all food. This food names generically human food, an animal and livestock feed, pet food, etc. Since it is the water-soluble reduction difficulty slaking property starch syrup which used starch as the raw material, a dietary fiber is contained and it can be used for food also as a low-calorie-content extending agent, all the food that can use a dextrin, a malto dextrin, a starch syrup, a restoration water candy, a reduction maltose starch syrup, etc. conventionally as an application is included.
[0014] If those food is illustrated, liquids, such as coffee, tea, cola, and juice, and powdered drinks Bakeries, such as a pan, Cookie, a biscuit, a cake, pizza, and a pie Pastas, such as noodles, such as Houdon, a rahmen, and a buckwheat, spaghetti, macaroni, and FETTOCHINE, Confectionary, such as a candy, chocolate, and chewing gum, a doughnut, Frozen desert, such as oil confectionary, such as potato chips, ice cream, a shake, and sherbet A cream, a cheese head, milk powder, condensed milk, creamy powder, a coffee whitener, Dairy products, such as a milk beverage, a pudding, yogurt, drink yogurt, jelly, Chilled desserts, such as a mousse and Bavarian cream, various soup, a stew, gratin, Retort pouches, such as Calais, thru/or canning, various bean paste, soy sauce, the source, Seasonings, such as catsup, mayonnaise, a dressing, bouillon, and various roux Meat workpieces and those frozen foods, such as a hum, a sausage, a hamburger, a meatball, and corned beef, Frozen processed foods, such as pilaf, a croquette, an omelet, and doria, a crab stick, Processed marine products, such as boiled fish paste, desiccation mashed potatoes, a jam, marmalade, Agricultural production workpieces, such as peanut butter and PINATSU, other food boiled down in soy, rice cake, a rice confectionery, snack foods, fast foods, etc. are alcoholic beverages, such as wine, Biel, a cocktail, fizz, and liqueur. etc. further, and can be effectively used to these all.
[0015] The example of an experiment explains this invention to a detail below.
[assay of a dietary fiber] -- Mamoru of May 23, Heisei 8 Notice of the Ministry of Health and Welfare -- new -- the inside of the assay of a dietary fiber of analytical method, such as a nutrition component specified to No. 47, -- Prosky -- according to the high-speed liquid chromatography applied to the food containing the low-molecular water solubility dietary fiber with which analysis is made difficult, the quantum was carried out only by law.
1) First, by the Prosky method (399 Prosky, L et al, J.Assoc.Off.Anal.Chem., 68, (2), 1985), make it digest by

amyloglucosidase following digestion by heat stability alpha-amylase, and digestion by the protease, add ethanol to this enzyme reaction liquid, make precipitation generate, and filter. Desiccation weighing capacity of this residue is carried out, and the dietary fiber content A (% of the weight) is calculated.
2) Next condense a filtrate, and consider as the enzyme processing liquid which considers as 100ml constant volume and contains a low-molecular water solubility dietary fiber after removing a solvent. This is dipped in ion exchange resin, it extrudes with distilled water, and an eluate is set to 200ml. This solution is condensed, and it is referred to as Brix5, it filters with the membrane filter of 0.45 micrometers of apertures, and the sample solution is obtained.
3) Present high performance chromatography the following condition and obtain high-speed liquid chromatogram. It asks for the area of grape sugar and a dietary fiber fraction or an internal standard substance, and a dietary fiber fraction.
[0016] <high-speed liquid chromatograph operating condition> column temperature: -- 80 degree-C-85 degree-C mobile phase: -- stream **: -- 0.3 ml/min injection rate: -- the grape sugar in the sample solution obtained by 20microl42 are measured by the pyranose oxidase, the content is calculated, and it considers as the standard substance.
5) Count low-molecular water solubility dietary fiber weight (mg) and (B) =(peak area of dietary fiber)/(peak area of grape sugar) x (grape-sugar weight)
low-molecular [in desiccation / cleaning sample] -- low-molecular water solubility (dietary fiber E) (% of the weight) =Dx [1- (loss-on-drying weight %+ cleaning loss-in-quantity weight %)/100] in water-soluble (dietary fiber D) (% of the weight) =[dietary fiber weight B (mg)] / [amount of sampling (mg)] x100 student sample
the inside of a raw sample -- the total -- dietary fiber (% of the weight) = Prosky -- dietary fiber weight %(A)+ low-molecular water solubility dietary fiber weight % (E) called for by law
[0017] [the method of computing an energy value] -- since the caloric value of a saccharide is 4 kg-cal/g -- energy (value F) (kilogram calorie/g) =4x in a raw sample [(B % of the weight of low-molecular water solubility dietary fibers in a 100-student sample) /100]
Since 3 kg-cal, maltitol, and a malto try toll are specified for the energy value of a sorbitol as 2 kg-cal, the energy value of the product of this invention is computed by the bottom type. However, the contents of a sorbitol, maltitol, and a malto try toll are indicated to be S % of the weight, M % of the weight, and T % of the weight, respectively.
Energy value (a kilogram calorie/g) = F-Sx(4-3)-Mx(4-2)-Tx (4-2)
[0018] [Measuring method of a degree of sweetness] Four kinds of cane-sugar solutions of sweet taste near the 30-% of the weight solution of a sample were prepared at intervals of concentration 1% of the weight, organoleptics (drinking and comparing) were performed, and the degree of sweetness was computed by the bottom type.
Degree of sweetness = the 50-% of the weight solution of [the concentration (% of the weight) of a corresponding cane sugar solution] / 30(% of the weight) x100 [measuring method of viscosity] sample was prepared, and the viscosity in each temperature was measured by the Brookfield viscometer.
[Measuring method of osmotic pressure and freezing point depression] The osmotic pressure and freezing point depression in each concentration were measured using OSMOTRON-10.
[0019] [Measuring method of whenever [coloring]] The absorbance of 420nm and 720nm was measured for the 10-% of the weight solution of a sample using the 10cm cel by spectrophotometer-for-ultraviolet-and-visible-region UV-160 (Shimadzu manufacture), and the difference was considered as whenever [coloring].
[Measuring method of sugar composition] 10microl extraction of a solution is done 5% of the weight, and it analyzes by the high-speed liquid chromatograph of the following conditions.
High-speed liquid chromatograph condition column Mitsubishi MCI GEL CK04SS detector Differential refractometer column temperature The 80-degree-C rate of flow 0.3 ml/min
Eluate DP1, DP2, and DP3 of the notation of a water-analysis result are equivalent to a sorbitol, maltitol, and a malto try toll, respectively.
[0020] [the measuring method of DE] -- DE -- Dextrose the index which is the abbreviation for Equivalent (grape-suga equivalent), and is widely used for expressing extent of hydrolysis of an amylolysis object -- it is -- WIRUSHUTETTA Shue Dell -- reducing sugar were measured as grape sugar using law, and the ratio to the solid content 100 of the reducing sugar was set to DE.
[Measuring method of concentration] Brix degree measured with the reflex Brix scale (product made from ATAGO) was made into weight % concentration.
The example of an experiment explains this invention to a detail below.

[0021]
[Example(s) of Experiment]
[The example 1 of an experiment] Commercial corn starch was put into the ribbon type mixer, and after having carried out the spray, and equalizing through a grinder continuously, rotating a mixer so that the hydrochloric acid of concentration may be set to 400 ppm to corn starch using application-of-pressure air 1% of the weight, it riped in the ribbon mixer further for 4 hours. After carrying out predrying of this mixture so that it may become about 4% of the weight about moisture with a flash dryer, it supplied to the roast machine, it roasted over 150 degrees C for 20 minutes, and the roast dextrin was obtained. This roast dextrin was dissolved in water, it considered as the solution of concentration 35% of the weight, Termamyl [0.2% of the weight of] 60L (trade name: heat-resistant alpha-amylase pharmaceutical preparation of the Novo Nordisk bio-industry company manufacture) was added, and it hydrolyzed for 10 minutes at 90 degrees C. Next, heat-treatment was carried out for 20 minutes at 130 degrees C within the application-of-pressure container. Hydrolysis liquid was diluted to Bx the concentration of 30 degrees, pH was adjusted to 5.5, 0.2% of the weight of BIOZAIMU L (trade name: beta-amylase pharmaceutical preparation of the Amano Pharmaceuticals company manufacture), and 0.215% of the weight of pullulanase / Amano (trade name: debranching enzyme of the Amano Pharmaceuticals company manufacture) were added to a part for a liquid-solid form, and it hydrolyzed at 55 degrees C for 15 hours. After carrying out decolorization filtration of this hydrolysis liquid with activated carbon and carrying out demineralization processing with ion exchange resin, vacuum concentration was carried out and the difficulty slaking property starch syrup whose content of a dietary fiber is 46.2 % of the weight of liquid-solid form part hits was obtained at 65 % of the weight of concentration.
[0022] Next, 1kg of this difficulty slaking property starch syrup solution is put into the 2l. reaction container for reduction, Raney nickel catalyst R239 (trade name: ******-ized company manufacture) 20g is added as a catalyst, and it is hydrogen gas 100 kg/cm2 It was filled up until it reached the pressure, and the reduction reaction was performed at 130 degrees C for 3 hours, stirring by 400 - 600rpm. The reduction object was filtered, and it desalted [after separating a catalyst, it desalted by activated carbon, and] with ion exchange resin after decolorization filtration, and condensed to 70 % of the weight of concentration, and about 710g reduction difficulty slaking property starch syrup was obtained. The analysis value per solid content of this reduction difficulty slaking property starch syrup (it is indicated as this invention article below) is shown in a table 1.
[0023]
[A table 1]
Polymerization degree Content DP 1 of each component (% of the weight) 5.6DP2 47.0DP3 5.3DP4 3.4DP5 4.5DP6 Seven or more 3.5DP 30.7 dietary-fiber content 44.0 energy value 1.14 kg-cal [0024]
[Object sex test] About this invention article, cane sugar, a sorbitol, maltitol, poly glucose, Starch, a difficulty slaking property dextrin (trade name FAIBASORU -2 of the Matsutani Chemical Industry Co., Ltd. manufacture), A maltose, a malto dextrin (trade name TK-16 of the Matsutani Chemical Industry Co., Ltd. manufacture), The result of having performed examination of an energy value, a degree of sweetness, viscosity, slaking property, digestion nature, carious, fermentability, osmotic pressure, freezing point depression, and stability as contrasted with the candy powder (pineapple DEKKUSU #3 of the Matsutani Chemical Industry Co., Ltd. manufacture) is as follows.
1. An energy value is about 1 kg-cal/g.
2. The measurement result by the organoleptic test of a degree of sweetness is shown in a table 2.
[0025]
[A table 2]
Cane sugar 100 sorbitols 65 inventions The measured value of 403. viscosity viscosity is shown in a table 3.
[0026]
[A table 3]
(Unit: cps)
20 degrees C 40 degrees C 60 degrees C This invention article 25 13 8 Cane sugar 16 7 4 Maltitol 20 11 7 Poly glucose 42 17 12 [0027] 4. Slaking Property (In Vitro Trial)
1) Slaking property by salivary amylase Test condition Buffer solution : 45mM (screw) tris buffers (pH6.0) Sample-liquid concentration: 4.55 % of the weight Enzyme : Homo sapiens salivary amylase Type IX-A Reaction temperature : 37 degrees C Reaction time : 30 minutes Analysis of sugar : A measurement test result is shown for generation reducing sugar in a table 4 with a Somogyi-Nelson's method.

[0028]
[A table 4]
Sample Cracking severity (% of the weight)
This invention article 0.00 difficulty slaking property dextrin 0.67 starch 25.7 [0029]
2) Slaking property by the tunica-mucosa-intestini-tenuis enzyme Test condition Buffer solution : 45mM maleic-acid sodium buffer solution (pH6.6)
Sample-liquid concentration: 0.45 % of the weight Enzyme : Rat small intestine acetone powder (SIGMA)
Reaction temperature : 37 degrees C Reaction time : 180 minutes Analysis of sugar : The generated glucose is measured by the pyranose oxidase.
A test result is shown in a table 5.
[0030]
[A table 5]
Sample Cracking severity (% of the weight)
This invention article 10.0 difficulty slaking property dextrin 11.2 maltoses 93.2 [0031] this invention article is not disassembled at all by the result of tables 4 and 5 by Homo sapiens salivary amylase, but it is shown only being slightly decomposed by rat small intestine acetone powder and that it is.
5. Digestion Nature (In Vivo Trial)
Six healthy adults were made to take in the 50g this invention article and TK-16 (trade name: malto dextrin of DE 16 [about] of the Matsutani Chemical Industry Co., Ltd. manufacture), it collected blood with time, and the blood sugar level was measured. Consequently, as shown in drawing 1 , it was admitted that this invention article did not raise blood sugar. This can presume reaching as it is to the large intestine in an upper gastrointestinal tract, without receiving digestion.
[0032] 6. Acid production of this invention article, insoluble glucan generation, and insoluble glucan generation inhibition ability were examined using S.mutans which is the main cause bacillus of a carious caries.
1) The result of having measured pH when adding each saccharide to the S.mutans suspension adjusted to pH7.0 in the acid production sodium-hydroxide water solution, and cultivating at 37 degrees C for 6 hours is shown in a table 6.
[0033]
[A table 6]
Sample pH blank after 6-hour culture (sugar additive-free) 6.30 inventions 6.25 glucoses 5.26 cane sugars 5.21 maltitol 6.27 poly glucose 5.23 [0034] Most acid production by S.mutans was not seen by this invention article like maltitol from a table 6.
2) The glucosyltransferase which insoluble glucan generation ability S.mutans produces is added in the solution of each saccharide, it cultivates for 3 hours and 37 degrees C of results of having measured the absorbance in the wavelength of 550nm with the spectrophotometer are shown in a table 7.
[0035]
[A table 7]
Sample Absorbance blank after a 3-hour reaction (sugar additive-free) 0.075 inventions 0.083 glucoses 0.084 cane sugars 0.352 maltitol 0.083 poly glucose 0.083 [0036] Generation of insoluble glucan according [this invention article] to glucosyltransferase was not accepted from a table 7.
3) the insoluble glucan generation inhibition ability 2 -- the same -- glucosyltransferase -- the solution of each saccharide -- adding -- further -- cane sugar -- adding -- 37 degrees C -- 3 hours -- and it reacts for 24 hours -- making -- the absorbance in 550nm -- cane sugar -- the numeric value which computed as 100 the case of being independent is shown in a table 8 and a table 9.
[0037]
[A table 8]
Cane sugar: Addition of a sample Sample 1:1 1:2 1:4 This invention article 93.5 87.0 80.9 Glucose 95.3 85.6 76.9 Maltitol 93.1 86.3 75.1 Poly glucose 96.8 94.9 84.1 [0038]
[A table 9]
Cane sugar: Addition of a sample Sample 1:1 1:2 1:4 This invention article 68.2 59.4 44.7 Glucose 69.6 57.4 43.4 Maltitol 63.8 56.7 45.9 Poly glucose 85.7 81.3 81.0 [0039] The work to which this invention article controls generation of insoluble glucan from cane sugar was accepted so that clearly from a table 8 and a table 9. In order not to accept

production of the acid by S.mutans whose this invention article is the main cause bacillus of a caries, and generation of the insoluble glucan which caused the dental plaque from the result of above 1, 2, and 3 and to control generation of insoluble glucan, it was checked that it is a non-carious saccharide.
[0040] 7. Various kinds of bacteria examined the fermentability of a fermentability this invention article.
1) After drinking in moderation to the culture medium containing 0.5% of the weight of each saccharide and cultivating the suspension of Micrococcus which is the main bacillus of Neto of a hum sausage, and Leuconostoc for 37 degrees C and three days, the amount of 1/50-N sodium hydroxide taken to adjust to a pH value and pH6.5 was measured. A result is shown in a table 10.
[0041]
[A table 10]
Micrococcus Leuconostoc A sample pH The amount ml of NaOH(s) pH The amount ml of NaOH(s) Blank 5.82 (sugar additive-free) 0.62 5.61 0.89 This invention article 6.20 0.31 5.42 1.25 Glucose 4.04 5.59 4.03 7.95 Cane sugar 4.21 6.00 4.23 8.10 maltitol 6.13 0.34 5.47 1.15 poly glucose 5.08 1.75 4.89 2.15 [0042] 2) pH was measured, after inoculating the suspension of lactic-acid-bacteria E.faecalis, L.acidophilus, and B.longum into the culture medium containing 0.5% of the weight of each saccharide and cultivating it for 37 degrees C and four days. A result is shown in a table 11.
[0043]
[A table 11]
E. faecalis L.acidophilus B.longum A sample pH pH pH Blank (sugar additive-free) 5.85 6.34 5.81 This invention article 5.64 5.55 4.95 Glucose 4.37 4.34 4.24 Cane sugar 4.25 4.48 4.22 Maltitol 5.75 5.55 5.55 Poly glucose 5.49 5.37 5.35 [0044] It was checked from the result of a table 10 and a table 11 that this invention article is a saccharide with low fermentability.
8. The result of having measured osmotic pressure and freezing point depression for osmotic pressure and freezing-point-depression each sample as a water solution of about 10-degreeBx concentration is shown in a table 12.
[0045]
[A table 12]
Sample Concentration (degreeBx) Osmotic-pressure (mOsm/cm2) freezing point depression (degree C) This invention article 11.4 300 1.37 Cane sugar 11.5 378 0.70 Maltitol 11.5 333 0.62 Wrye Tess II 11.5 191 0.35 [0046] 9. this invention article and the 10-% of the weight solution of a candy powder were prepared using the buffer solution (1 % of the weight content of glycines) adjusted to stability test 1 browning 4.5 and pH 6.5, it heated in the ebullition water bath for 3 hours, the test sample for chemical analysis was extracted with time in the meantime, whenever [coloring] was measured, and the browning reaction was considered. A result is shown in drawing 2 . It is shown that this invention article hardly browns the result of drawing 2 .
2) Whenever [coloring], and sugar composition were measured about the sample heated at 100 degrees C for 1 hour after adding 0.25 % of the weight of citric acids, and 0.05 % of the weight of ascorbic acids in the 10-% of the weight water solution of the heating stability this invention article under acidity, and stability was examined. A result is shown in a table 13.
[0047]
[A table 13]
An item Before heating After heating Whenever [coloring] 0.010 0.050 Sugar composition DP1 9.6 9.8 DP2 29.6 29.8 DP3 3.1 3.1 DP4 6.2 6.2 DP5 4.8 4.5DP6 4.1 4.0 More than DP742.6 42.6[0048] Whenever [coloring] increased from a table 13 slightly after heating, and disassembly of configuration sugar was not accepted by request.
3) After boiling down and heating and boiling down to 160 degrees C on the electric cooker of 600W after [under acidity] adding 1.0 % of the weight of citric acids to 100g of a stability this invention article and preparing concentration to 75% of the weight, it slushed into the mold, it cooled radiationally and the candy was made as an experiment. it boils down, whenever [before and after coloring], and sugar composition (% of the weight) are measured, and it can set under acidity -- it boiled down and stability was examined. A result is shown in a table 14.
[0049]
[A table 14]
An item Before heating After heating Whenever [coloring] 0.010 0.015 Sugar composition DP1 9.6 10.1 DP2 29.6 29.2 DP3 3.1 3.5 DP4 6.2 6.0DP5 4.8 4.8DP6 4.1 4.2 More than DP742.6 42.2[0050] The dramatically stable thing was

accepted from it boiling down from a table 14 and there being no difference in sugar composition whenever [before and after coloring]. Next, an example is shown.

[0051]

[Example 1] The roast dextrin manufactured in the example 1 of an experiment is hydrolyzed by Termamyl 60L on the example 1 of an experiment, and these conditions. The hydrolysis liquid heat-treated and obtained is diluted to Bx the concentration of 30 degrees, pH is adjusted to 5.5, and it is 0.2% of the weight of Fungamyl to a part for a liquid-solid form. 900L (trade name: saccharification of the mold origin of the Novo Nordisk bio-industry company manufacture mold alpha-amylase), 0.215% of the weight of pullulanase / Amano was added similarly, and it hydrolyzed at 55 degrees C for 15 hours. After carrying out decolorization filtration of this hydrolysis liquid with activated carbon and carrying out demineralization processing with ion exchange resin, vacuum concentration was carried out and the difficulty slaking property starch syrup of 65 % of the weight of concentration was obtained. 18.55kg of this difficulty slaking property starch syrup is put into the 20l. reaction container for reduction, the same Raney nickel catalyst 420.338.1g as the example 1 of an experiment is added, and it is hydrogen gas 96 kg/cm2 It was filled up until it reached the pressure, and the reduction reaction was performed at 130 degrees C for 3 hours, stirring by 500rpm. The reduction object was filtered, and it desalted [after separating a catalyst, it desalted by activated carbon, and] with ion exchange resin after decolorization filtration, it condensed to 70 % of the weight of concentration, and about 14.9kg reduction difficulty slaking property starch syrup was obtained.

[0052]

[Example 2] The hydrolysis liquid which made hydrolysis and heat-treatment by Termamyl 60L on these conditions by having made into the example 1 of an experiment the roast dextrin manufactured in the example 1 of an experiment, and was obtained was diluted to Bx the concentration of 30 degrees, pH was adjusted to 5.5, 0.215% of the weight of pullulanase / Amano was similarly added to a part for a liquid-solid form with 0.2% of the weight of BIOZAIMU L (trade name: beta-amylase of the Amano Pharmaceuticals company manufacture), and it hydrolyzed at 55 degrees C for 15 hours. After carrying out decolorization filtration of this hydrolysis liquid with activated carbon and carrying out demineralization processing with ion exchange resin, vacuum concentration was carried out and the difficulty slaking property starch syrup of 65 % of the weight of concentration was obtained. 19.80kg of this difficulty slaking property starch syrup was put into the 20l. reaction container for reduction, and the same Raney nickel catalyst 420.2g as the example 1 of an experiment was added, it was filled up with hydrogen gas until it reached the pressure of 95 kg/cm2, and the reduction reaction was performed at 130 degrees C for 3 hours, stirring by 500rpm. The reduction object was filtered, and it desalted [after separating a catalyst, it desalted by activated carbon, and] with ion exchange resin after decolorization filtration, it condensed to 70 % of the weight of concentration, and about 15.7kg reduction difficulty slaking property starch syrup was obtained. The analysis value per solid content of the reduction difficulty slaking property starch syrup of examples 1 and 2 is shown in a table 15.

[0053]

[A table 15]

	各成分の含量（重量%）	
重合度	実施例1	実施例2
DP1	19.1	5.9
DP2	29.4	29.7
DP3	2.7	11.0
DP4	1.9	4.8
DP5	8.6	5.4
DP6	4.0	4.6
DP7以上	34.3	28.6
食物繊維	40.1	45.2
エネルギー値	1.44	1.32

[0054]

[Example 3] By solid content, after heating the reduction difficulty slaking property starch syrup manufactured in the

example 1 of an experiment until the temperature of goods became 160 degrees C, stirring gently [for a 1l. stainless steel container / on the electric heater of 600W] 500g, it was cooled radiationally to about 80 degrees C, and the mold cavity made from stainless steel was made to slush and cast and solidify it. The mold cavity was made reverse after about 15 minutes, the edge was twisted, it removed from shuttering, and Kandy of this invention was obtained. Obtained Kandy had the good mold blank, and the moisture of 0.3 % of the weight and an appearance was transparent, there was no surface irregularity, and when it bit, moderate gear-tooth brittleness was sensed.
[0055]
[The example 1 of a comparison] Kandy was made as an experiment like the example 3 except having used 200g for 300g of granulated sugar, and the FUJISHI lap 38 (trade name: starch syrup by the Kato Chemistry company) by solid content. Obtained Kandy has a good mold blank and, as for moisture, gear-tooth brittleness with an appearance moderate when [at which it was a little yellowish] it is transparent, there is no surface irregularity and it bites was sensed 0.4% of the weight.
[0056]
[The example 2 of a comparison] Kandy was made as an experiment like the example 3 except having used 500g for the mull bit (trade name: Hayashibara Biochemical Laboratories reduction maltose starch syrup) by solid content. Obtained Kandy had the poor mold blank, 0.3% of the weight, although it was transparent, Kandy adhered to the gear tooth at interlocking and a gear tooth, and moisture was sensed unpleasant for the appearance, when it bit.
[0057]
[Comparative study 1] (Porosity test)
The firmness trial of Kandy was performed by the following approaches using Kandy prepared in an example 3 and the examples 1 and 2 of a comparison. Respectively each Kandy was put into the weighing capacity can, and was saved at 81% of relative humidity, and each 30**1-degree C constant humidity desiccator, weight was measured with time, and "weight rate of change (% of the weight)" of moisture was computed by the degree type. [one] A result is shown in a table 16.
Weight rate of change (% of the weight) = weight x100-100[0058] before the weight / preservation after preservation
[A table 16]
Sample 24 hours after 48 hours after 72 hours after Example 3 3.8 8.4 11.3 Example 1 of a comparison 4.9 9.4 12.7 Example 2 of a comparison 6.6 14.8 17.4 [0059]
[Comparative study 2] (Firmness trial)
Each Kandy prepared in an example 3 and the examples 1 and 2 of a comparison was put into the Petri dish which covered with plotting paper, it saved for 48**1 hour within 30**1 degree C and the constant humidity desiccator of 81% of relative humidity, the area into which Kandy flowed according to moisture absorption was measured, and "flow (%)" was calculated by the degree type. A result is shown in a table 17.
Area x100[0060] of Kandy before area / preservation of Kandy after flow (%) = preservation
[A table 17]
Sample It flows (%).
Example 3 Example 1 of 400 comparisons Example 2 of 400 comparisons 855 [0061] The result of a table 17 of "flow" of Kandy of an example 3 was equivalent to the example 1 of a comparison, and all were below one half of the example 2 of a comparison.
[Comparative study 3] (Heat instability test)
Immediately after manufacture, the seal package was carried out, each Kandy prepared in an example 3 and the examples 1 and 2 of a comparison was saved in each temperature of 40 degrees C, 45 degrees C, and 50 degrees C by the packing material made from aluminum, and the thermal stability of Kandy was observed with time. The assessment approach expressed that in which ** and Kandy are dissolving that from which O and Kandy have adhered strongly and they cannot separate easily what can detach by hand that change will be in a condition easily although O and Kandy have adhered lightly, and the form has collapsed with the notation of x. A result is shown in a table 18. However, as for a right-hand side notation, the notation on the left-hand side of each column will show the 2nd day in the 1st day.
[0062]
[A table 18]
Sample 40 degrees C 45 degrees C 50-degree-C example 3 O/O O/O Example 1 of an O/O comparison O/O O/O

Example 2 of an O/O comparison x/x x/x x/x [0063] Similarly, the result of a table 18 of Kandy of an example 1 is also equivalent to the example 1 of a comparison, and all obtained the good result rather than the example 1 of a comparison.
[Comparative study 4] (Gear-tooth brittleness trial)
1 hour after preparing each Kandy prepared in an example 3 and the examples 1 and 2 of a comparison, three places are bit for every Kandy, respectively. Although it was hard, the notation of x expressed having used ** and the thing which is hard and does not break as having no gear-tooth brittleness by having made into those with gear-tooth brittleness O and the thing into which Kandy is divided, noting that gear-tooth brittleness was excellent in the thing of equivalent gear-tooth brittleness on the basis of Kandy of the example 1 of a comparison. A result is shown in a table 19.
[0064]
[A table 19]
Sample Gear-tooth brittleness example 3 Example 1 of O comparison Example 2 of O comparison x [0065] The example 3 was equivalent to the example 1 of a comparison, and superior to the example 2 of a comparison.
[Example 4] After the temperature of goods heated 425g to 170 degrees C like an example 3, the reduction maltose starch syrup which used the reduction difficulty slaking property starch syrup of an example 1 in 75g and the example 2 of a comparison by solid content was cooled radiationally to about 80 degrees C, and the mold cavity made from stainless steel was made to slush and cast and solidify it by solid content. Obtained Kandy had the good mold blank, 0.2% of the weight, the appearance of moisture is transparent, it does not have surface irregularity, and firmness obtained good Kandy.
[0066]
[Example 5] After the temperature of goods heated 350g to 170 degrees C like an example 3, the reduction maltose starch syrup which used the reduction difficulty slaking property starch syrup of an example 1 in 150g and the example 2 of a comparison by solid content was cooled radiationally to about 80 degrees C, and the mold cavity made from stainless steel was made to slush and cast and solidify it by solid content. Obtained Kandy had the good mold blank, 0.3% of the weight, the appearance of moisture is transparent, it does not have surface irregularity, and firmness obtained good Kandy.
[0067]
[Example 6] After it carried out 150g and the Lacty toll (Nikken Chemicals Co., Ltd. make) by solid content and the temperature of goods heated 350g to 170 degrees C like an example 3 by solid content, the reduction difficulty slaking property starch syrup of an example 1 was cooled radiationally to about 80 degrees C, and the mold cavity made from stainless steel was made to slush and cast and solidify it. Obtained Kandy had the good mold blank, 0.2% of the weight the appearance of moisture is transparent, it does not have surface irregularity, and firmness obtained good Kandy.
[0068]
[Example 7] After it carried out 350g and erythritol (Nikken Chemicals Co., Ltd. make) by solid content and the temperature of goods heated 150g to 170 degrees C like an example 3 by solid content, the reduction difficulty slaking property starch syrup of an example 1 was cooled radiationally to about 80 degrees C, and the mold cavity made from stainless steel was made to slush and cast and solidify it. Obtained Kandy had the good mold blank, 0.2% of the weight the appearance of moisture is transparent, it does not have surface irregularity, and firmness obtained good Kandy.
[0069]
[Example 8] After it carried out 350g and sorbitol (trade name: sorbitol by Nikken Chemicals Co., Ltd.) by solid content and the temperature of goods heated 150g to 170 degrees C like an example 3 by solid content, the reduction difficulty slaking property starch syrup of an example 1 was cooled radiationally to about 80 degrees C, and the mold cavity made from stainless steel was made to slush and cast and solidify it. Obtained Kandy had the good mold blank, 0.2% of the weight, the appearance of moisture is transparent, it does not have surface irregularity, and firmness obtained good Kandy.
[0070]
[Effect of the Invention] The food which has various kinds of physiology effectiveness in addition to being low energy, and has obtaining the reduction difficulty slaking property starch syrup with which it is non-carious and browning nature has moderate sweet taste and viscosity low, and such effectiveness was obtained.

[Translation done.]

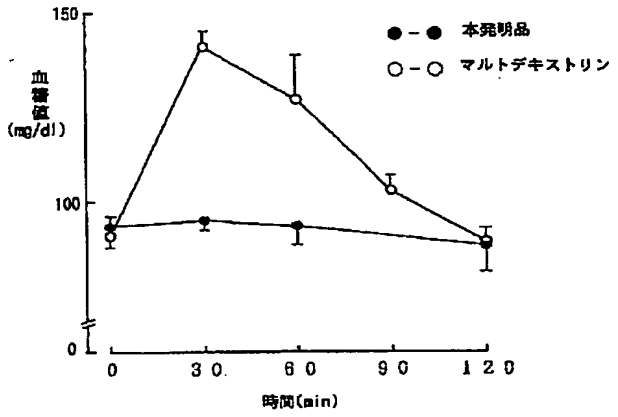
* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] The reduction difficulty slaking property starch syrup obtained by returning the difficulty slaking property starch syrup which hydrolyzed the roast dextrin which heats starch under an acid and 1 - 10% of the weight of existence of moisture, and is obtained by liquefaction mold alpha-amylase, used together a debranching enzyme, the beta-amylase, or a debranching enzyme and a saccharifying amylase further, hydrolyzed, and was obtained.
[Claim 2] The reduction difficulty slaking property starch syrup according to claim 1 characterized by the content of a dietary fiber being 30 - 60 % of the weight.
[Claim 3] The reduction difficulty slaking property starch syrup according to claim 1 or 2 characterized by the content of reduction 2 saccharide being 15 - 40 % of the weight.
[Claim 4] The reduction difficulty slaking property starch syrup according to claim 1 or 2 characterized by the content of reduction 2 saccharide being 20 - 30 % of the weight.
[Claim 5] A reduction difficulty slaking property starch syrup given in any 1 term of claims 1-4 characterized by an energy value being 2 kg-cal/g or less.
[Claim 6] Food which contains the reduction difficulty slaking property starch syrup of a publication in any 1 term of claims 1-5.

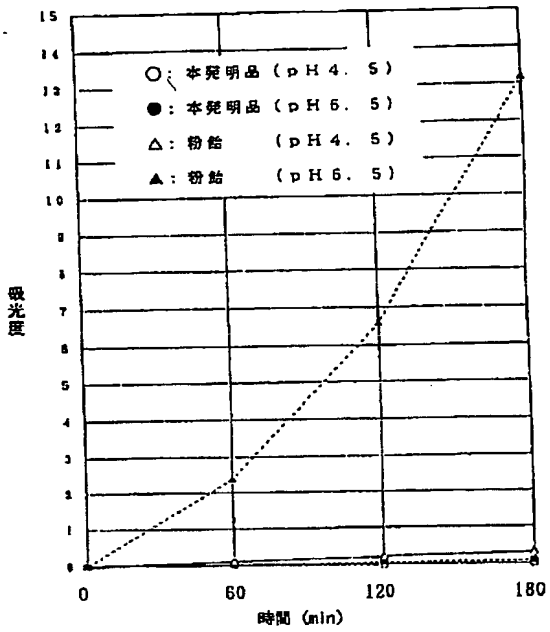
[Translation done.]

Drawing selection drawing 2



[Translation done.]

Drawing selection drawing 2



[Translation done.]